



Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-223



CVN 78 Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78)

As of FY 2017 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

Table of Contents

Common Acronyms and Abbreviations for MDAP Programs	3
Program Information	5
Responsible Office	5
References	5
Mission and Description	6
Executive Summary	7
Threshold Breaches	9
Schedule	11
Performance	15
Track to Budget	18
Cost and Funding	21
Low Rate Initial Production	46
Foreign Military Sales	47
Nuclear Costs	48
Unit Cost	49
Cost Variance	55
Contracts	62
Deliveries and Expenditures	67
Operating and Support Cost	68

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
\$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
\$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
\$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost

PB - President's Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

Program Information

Program Name

CVN 78 Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78)

DoD Component

Navy

Responsible Office

CAPT Chris Meyer
Program Executive Office (PEO) Aircraft Carriers
PMS 378
614 Sicard Street SE Stop 7007
Washington, DC 20376-7007

Phone: 202-781-3969
Fax: 202-781-4684
DSN Phone: 326-3969
DSN Fax: 326-4684
Date Assigned: June 9, 2011

chris.meyer@navy.mil

References

CVN 78

SAR Baseline (Development Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated April 23, 2004

Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated April 2, 2013

EMALS

SAR Baseline (Development Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated April 23, 2004

Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated April 2, 2013

Mission and Description

The CVN 78 Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78) is the planned successor to the NIMITZ-class (CVN 68) aircraft carrier. The CVN 78 mission is to provide credible, sustainable, independent forward presence during peacetime without access to land bases; operate as the cornerstone of a joint and/or allied maritime expeditionary force in response to crisis; and carry the war to the enemy through joint multi-mission offensive operations by: (a) being able to operate and support aircraft in attacks on enemy forces ashore, afloat, or submerged independent of forward-based land facilities, (b) protecting friendly forces from enemy attack through the establishment and maintenance of battle space dominance independent of forward-based land facilities, and (c) engaging in sustained operations in support of the United States and its allies independent of forward-based land facilities.

The CVN 78 Class Aircraft Carrier program includes major efforts for Nuclear Propulsion/Electric Plant Design, Electromagnetic Aircraft Launching System (EMALS) and all electric auxiliary systems. Additional design features and new technologies have been added, including a new/enlarged flight deck, improved weapons handling capabilities, and improved survivability.

Executive Summary

As of February 2016, the CVN 78 Class design is complete and on the lead ship, GERALD R. FORD (CVN 78), production is 97% complete. The Navy and shipbuilder are focused on activity necessary to finish construction, complete the test program, and deliver the ship. During this past year, the Initial Light Off of Dual Band Radar (DBR) began in May 2015.

Electromagnetic Aircraft Launching System (EMALS) shipboard catapult testing commenced on schedule in June 2015 and has completed 109 dead-load launches on the two bow catapults. The Advanced Arresting Gear (AAG) shipboard test program commenced July 18, 2015. The crew moved aboard as scheduled in August 2015. As of February 1, 2016, the shipbuilder has turned over 93% of compartments to the crew, and 80% of the overall shipboard testing has been completed.

With 3% of the production effort to go on CVN 78, the principal risk remains completing the shipboard test program and in particular, the test programs for concurrently developed systems, including EMALS, AAG and DBR. During EMALS testing in October 2015, the EMALS Prime Power Interface Sub System Transformer/Rectifier (T/R) #3 failed. The Navy has replaced the T/R with a spare, and dead-load testing has resumed. As of late February 2016, nine dead-load tests are complete. DBR testing is progressing. All three Multi-Function Radar arrays have been successfully energized at high power. The shipboard construction and test efforts for AAG are behind schedule due to delays in system development. Performance Testing was suspended at the AAG land based test site for approximately two years to investigate and correct critical design issues with major AAG components. System level installation and checkout testing is projected to complete in time to support first aircraft operations in Fall 2016. The Navy is monitoring the land based testing and software development efforts closely to ensure system level installation and checkout testing is complete in time to support first aircraft operations in Fall 2016.

Just as we have experienced learning on the design and construction of this first of class carrier, we are also experiencing learning during the testing phase. Reasonable time frames were allocated to complete the initial testing, but the compounding problems of first of class systems with first of class integration testing have taken longer than originally planned. Shipboard testing progress to date has been slower than anticipated. As a result, sea trials are expected to commence June 2016, and delivery is expected in late August/early September 2016. The Navy expects no schedule delay to CVN 78 deployability due to the sea trials delay and is managing these schedule delays within the \$12,887M cost cap.

CVN 78 is the numerical replacement for USS ENTERPRISE (CVN 65), inactivated on December 1, 2012. Upon delivery of CVN 78, the Navy carrier force will return to 11 ships as required by 10 U.S.C. 5062(b).

The Navy will conduct Full Ship Shock Trials (FSST) on CVN 78 prior to deployment in accordance with the ADM signed by USD(AT&L) on August 7, 2015. FSST will be conducted in FY 2019 following the completion of CVN 78 component shock qualification in FY 2016-FY 2018. Following FSST, CVN 78 will enter its scheduled maintenance availability and required training workups prior to being deployment ready in 2021.

On June 5, 2015, the Navy awarded to Huntington Ingalls Industries - Newport News Shipbuilding a Fixed Price Incentive Firm target contract in the amount of \$3.35B for the JOHN F. KENNEDY (CVN 79) Detail Design & Construction effort. Additionally, a \$941M modification to the Construction Preparation contract was awarded the same day. This modification included the remaining component and steel fabrication and selected construction unit assemblies already underway where proven performance results were available. Keeping like work on one contract reduces the cost of contract administration, enables better procurement oversight, and avoids potential errors in tracking workers' time charges for similar work scope on two separate contracts. An Integrated Baseline Review was conducted in January 2016.

The keel for CVN 79 was laid into the graving dock on August 22, 2015. CVN 79 is the force structure replacement for USS NIMITZ (CVN 68), which is scheduled for inactivation in 2025.

With 16.8% constructed based on total production hours, the shipbuilder is on track to achieve the negotiated 18% production hour reduction on CVN 79.

For CVN 79, the Navy has implemented a two-phase acquisition plan which will allow the basic ship to be constructed and tested in the most efficient manner by the shipbuilder (Phase I) while enabling select ship systems and compartments to be completed in Phase II, where the work can be completed more affordably through competition or the use of skilled installation teams. The two-phase strategy for CVN 79 capitalizes on schedule flexibility to deliver the ship at the lowest cost and enables the Navy to procure and install at the latest date possible shipboard electronics systems which otherwise would be subject to obsolescence prior to CVN 79's first deployment in 2027. All costs for both Phase I and Phase II are included within the CVN 79 end cost and are accounted for within the cost cap.

The FY 2017 PB submission for ENTERPRISE (CVN 80) is \$12.9B, \$572M below the FY 2016 PB submission, and \$974M below the FY 2015 PB submission. The Navy continues to seek out and implement cost reduction opportunities. To that end, Navy has established a Ford Class Design for Affordability RDT&E investment for the identification and development of initiatives to reduce construction costs.

As documented in the April 28, 2015 ADM, the USD(AT&L) will conduct annual in-process review DABs of the CVN 78 Class Program. The Navy and USD(AT&L) remain in discussions about the optimum timing for the program's Milestone C review.

Development and ship integration efforts for EMALS continue as planned. The System Development and Demonstration program is 99% complete. Land-based aircraft compatibility testing in Lakehurst, NJ completed in April 2014 and shipboard testing with dead-loads started in June 2015. The Lakehurst site will remain operational through 2017 to support shipboard testing, the correction of deficiencies, CVN 78 crew training, a maintainability demonstration, and logistics product development which is currently 81.5% complete. The delivery of EMALS hardware to CVN 78 is 100% complete. Shipboard commissioning began in August 2014 and will continue through 2016.

The EMALS CVN 79 production shipset contract was awarded as an Unfinalized Contract Action on June 12, 2015. Final contract finalization is planned for 3Q FY 2016.

There are no significant software-related issues with this program at this time.

Threshold Breaches

CVN 78

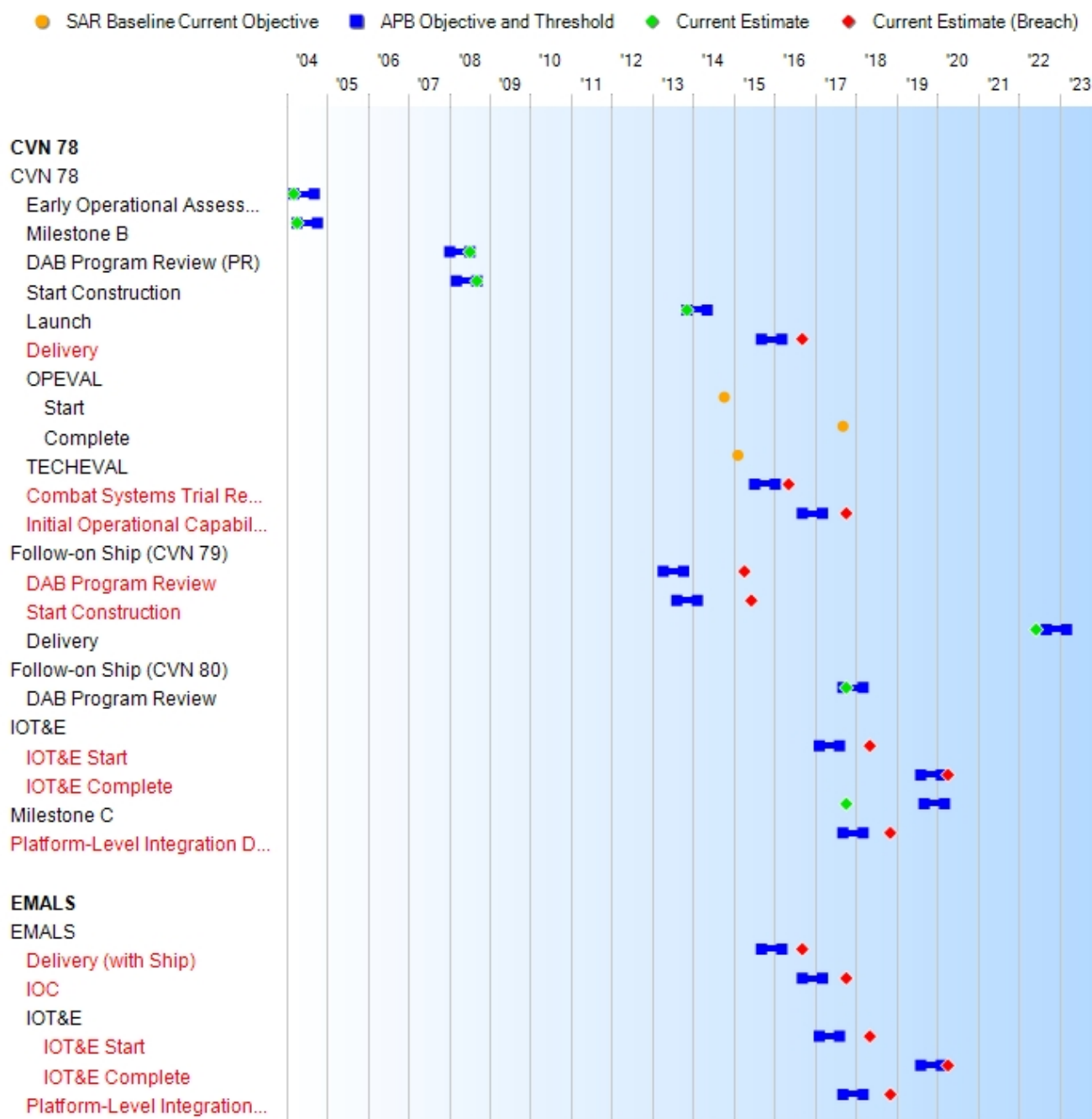
APB Breaches			Explanation of Breach
Schedule		<input checked="" type="checkbox"/>	Shipboard testing progress to date has been slower than anticipated. As a result sea trials are expected to commence on June 30, 2016. The shipboard testing delay has resulted in a delay to Combat Systems Trial Rehearsal which is now planned for May 2016. The delay in sea trials has resulted in a subsequent delay to CVN 78 Delivery and IOC, which are now planned for September 2016 and October 2017, respectively.
Performance		<input type="checkbox"/>	
Cost	RDT&E	<input type="checkbox"/>	
	Procurement	<input type="checkbox"/>	
	MILCON	<input type="checkbox"/>	
	Acq O&M	<input type="checkbox"/>	
O&S Cost		<input type="checkbox"/>	Further, as the Navy has addressed concerns expressed by the Government Accountability Office and the Director of Operational Test and Evaluation (D,OT&E) regarding the amount of overlap between Developmental Testing (DT) and Operational Testing, a realignment of the post-delivery test and trial period has resulted in a delay to Initial Operational Test and Evaluation (IOT&E) and Platform-Level Integration DT Period Complete. IOT&E Start, Platform-Level Integration DT Period Complete, and IOT&E Complete have been rescheduled to May 2018, November 2018, and April 2020, respectively.
Unit Cost	PAUC	<input type="checkbox"/>	
	APUC	<input type="checkbox"/>	
Nunn-McCurdy Breaches			CVN 79 DAB Program Review and Start Construction event breaches were previously reported in the December 2014 SAR. The Program Office is currently developing a Program Deviation Report (PDR) to address these changes and an APB update will be submitted at a future date.
Current UCR Baseline			
	PAUC	None	
	APUC	None	
Original UCR Baseline			
	PAUC	None	
	APUC	None	

EMALS

APB Breaches			Explanation of Breach
Schedule		<input checked="" type="checkbox"/>	EMALS will deliver and complete IOC as a component to the ship. The ship delivery and IOC have shifted to September 2016 and October 2017, respectively.
Performance		<input type="checkbox"/>	
Cost	RDT&E	<input checked="" type="checkbox"/>	Additionally, EMALS will reach IOT&E Start, Platform-Level Integration DT Period Complete, and IOT&E Complete with the ship and have been rescheduled to May 2018, November 2018, and April 2020, respectively.
	Procurement	<input type="checkbox"/>	
	MILCON	<input type="checkbox"/>	
	Acq O&M	<input type="checkbox"/>	
O&S Cost		<input type="checkbox"/>	The cost breach to RDT&E was previously reported in the December 2014 SAR for EMALS in the amount of \$5.5M. The program anticipates this breach to increase to approximately \$61.6M. This cost breach is the result of additional costs associated with maintaining the EMALS shore based test site and continued land
Unit Cost	PAUC	<input type="checkbox"/>	
	APUC	<input type="checkbox"/>	
Nunn-McCurdy Breaches			
Current UCR Baseline			

Original UCR Baseline	PAUC	None	based testing efforts.
	APUC	None	The Program Office is currently developing a PDR to address these changes and an APB update will be submitted at a future date.
	PAUC	None	
	APUC	None	

Schedule



CVN 78

Schedule Events				
Events	SAR Baseline Development Estimate	Current APB Development Objective/Threshold	Current Estimate	
CVN 78				
Early Operational Assessment	Mar 2004	Mar 2004	Sep 2004	Mar 2004
Milestone B	Apr 2004	Apr 2004	Oct 2004	Apr 2004
DAB Program Review (PR)	Jan 2006	Jan 2008	Jul 2008	Jul 2008
Start Construction	Jan 2007	Mar 2008	Sep 2008	Sep 2008
Launch	Nov 2012	Nov 2013	May 2014	Nov 2013
Delivery	Sep 2014	Sep 2015	Mar 2016	Sep 2016¹ (Ch-1)
OPEVAL				
Start	Oct 2014	N/A	N/A	N/A
Complete	Sep 2017	N/A	N/A	N/A
TECHEVAL	Feb 2015	N/A	N/A	N/A
Combat Systems Trial Rehearsal (CSTR)	Jul 2014	Jul 2015	Jan 2016	May 2016¹ (Ch-2)
Initial Operational Capability (IOC)	Sep 2015	Sep 2016	Mar 2017	Oct 2017¹ (Ch-3)
Follow-on Ship (CVN 79)				
DAB Program Review	Jan 2010	Apr 2013	Oct 2013	Apr 2015¹
Start Construction	Jan 2011	Aug 2013	Feb 2014	Jun 2015¹ (Ch-4)
Delivery	Sep 2018	Sep 2022	Mar 2023	Jun 2022
Follow-on Ship (CVN 80)				
DAB Program Review	Jan 2015	Sep 2017	Mar 2018	Oct 2017
IOT&E				
IOT&E Start	N/A	Feb 2017	Aug 2017	May 2018¹ (Ch-5)
IOT&E Complete	N/A	Aug 2019	Feb 2020	Apr 2020¹ (Ch-6)
Milestone C	Mar 2017	Sep 2019	Mar 2020	Oct 2017 (Ch-7)
Platform-Level Integration DT Period Complete	N/A	Sep 2017	Mar 2018	Nov 2018¹ (Ch-8)

¹ APB Breach

Change Explanations

(Ch-1) The current estimate for CVN 78 Delivery is revised from March 2016 to September 2016 to reflect delays associated with the shipboard testing and integration schedule.

(Ch-2) The current estimate for CSTR is rescheduled from November 2015 to May 2016 to reflect delays associated with the shipboard testing and integration schedule.

(Ch-3) The current estimate for IOC is rescheduled from March 2017 to October 2017 to reflect a shift in PSA start and completion dates resulting from the delay to delivery.

(Ch-4) The current estimate for CVN 79 Start Construction was revised from May 2015 to June 2015 to reflect actual date of contract award.

(Ch-5) The current estimate for IOT&E Start is revised from September 2017 to May 2018 to reflect shift in the PSA dates and partially to provide sufficient time for crew familiarization training and Platform Level DT integration testing with the new systems installed during PSA before commencing operational testing.

(Ch-6) The current estimate for IOT&E Complete is revised from February 2020 to April 2020 to reflect shift in the PSA dates and partially to provide sufficient time for crew familiarization training and Platform Level DT integration testing with the new systems installed during PSA before commencing operational testing.

(Ch-7) The current estimate for Milestone C is rescheduled from April 2015 to October 2017 to align with CVN 80 DAB Program Review.

(Ch-8) The current estimate for Platform-Level Integration DT Period Complete is rescheduled from April 2018 to November 2018 to reflect a shift in PSA start and completion dates resulting from the delay to delivery.

Acronyms and Abbreviations

CSTR - Combat Systems Trial Rehearsal

DT - Developmental Testing

IOT&E - Initial Operational Test & Evaluation

OPEVAL - Operational Evaluation

PSA - Post Shakedown Availability

TECHEVAL - Technical Evaluation

EMALS

Schedule Events				
Events	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate
EMALS				
Delivery (with Ship)	Sep 2015	Sep 2015	Mar 2016	Sep 2016 ¹ (Ch-1)
IOC	Sep 2016	Sep 2016	Mar 2017	Oct 2017 ¹ (Ch-2)
IOT&E				
IOT&E Start	Feb 2017	Feb 2017	Aug 2017	May 2018 ¹ (Ch-3)
IOT&E Complete	Aug 2019	Aug 2019	Feb 2020	Apr 2020 ¹ (Ch-4)
Platform-Level Integration DT Period Complete	Sep 2017	Sep 2017	Mar 2018	Nov 2018 ¹ (Ch-5)

¹ APB Breach

Change Explanations

(Ch-1) The current estimate for CVN 78 Delivery is revised from March 2016 to September 2016 to reflect delays associated with the shipboard testing and integration schedule.

(Ch-2) The current estimate for IOC is rescheduled from March 2017 to October 2017 to reflect a shift in PSA start and completion dates resulting from the delay to delivery.

(Ch-3) The current estimate for IOT&E Start is revised from September 2017 to May 2018 to reflect shift in the PSA dates and partially to provide sufficient time for crew familiarization training and Platform Level DT integration testing with the new systems installed during PSA before commencing operational testing.

(Ch-4) The current estimate for IOT&E Complete is revised from February 2020 to April 2020 to reflect a shift in the PSA dates and partially to provide sufficient time for crew familiarization training and Platform Level DT integration testing with the new systems installed during PSA before commencing operational testing.

(Ch-5) The current estimate for Platform-Level Integration DT Period Complete is rescheduled from April 2018 to November 2018 to reflect a shift in PSA start and completion dates resulting from the delay to delivery.

Acronyms and Abbreviations

DT - Developmental Test

IOT&E - Initial Operational Test & Evaluation

PSA - Post Shakedown Availability

Performance

CVN 78

Performance Characteristics				
SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Demonstrated Performance	Current Estimate
CVN 78				
Interoperability				
Note 2	N/A	N/A	TBD	N/A
Sustained Sortie Rate				
220	220	160	TBD	172
Surge Sortie Rate				
310	310	270	TBD	284
Ship Service Electrical Generating Capacity (times NIMITZ Class capacity in MW)				
3.0	3.0	2.5	TBD	2.7
Weight Service Life Allowance (% of full load displacement in long tons)				
7.5	7.5	5.0	TBD	5.9
Stability Service Life Allowance (feet)				
2.5	2.5	1.5	TBD	1.5
Ship's Force Manpower (billets)				
2391	2391	2791	TBD	2628
Follow-on Ship				
Interoperability				
Note 2	N/A	N/A	N/A	N/A
Sustained Sortie Rate				
220	N/A	N/A	N/A	N/A
Surge Sortie Rate				
310	N/A	N/A	N/A	N/A
Service Electrical Generating Capacity (times NIMITZ Class capacity in MW)				
3.0	N/A	N/A	N/A	N/A
Weight Service Life Allowance (% of full load displacement in long tons)				
7.5	N/A	N/A	N/A	N/A
Stability Service Life Allowance (feet)				
2.5	N/A	N/A	N/A	N/A
Ship's Force Manpower (billets)				

2391	N/A	N/A	N/A	N/A
Force Protection and Survivability in an Asymmetric Threat Environment				
Survivability				
N/A	Level III as defined by OPNAV Instruction 9070.1	Level II as defined by OPNAV Instruction 9070.1 with the exception of Collective Protection System	TBD	Level II as defined by OPNAV Instruction 9070.1 with the exception of Collective Protection System
Net-Ready				
N/A	Meets 100% of top level IERs	Meets 100% of top level IERs designated as critical	TBD	Meets 100% of top level IERs designated as critical

Classified Performance information is provided in the classified annex to this submission.

Requirements Reference

Operational Requirements Document (ORD) Change 2 dated June 22, 2007

Change Explanations

None

Notes

CVN 78 performance Threshold and Objectives apply to all ships in the class. Current estimates for the follow-on ship will be updated, if different from the lead ship, when they become available.

For additional description regarding CVN 78 and Follow-on Ship Interoperability and other Performance Characteristics, see Table 4.4, KPPs, contained in the Future Aircraft Carrier (CVN 21) ORD dated June 22, 2007.

Acronyms and Abbreviations

CBR - Chemical, Biological, Radiological
 IER - Interoperability Exchange Requirement
 MW - Megawatt
 OPNAV - Chief of Naval Operations

EMALS

Performance Characteristics				
SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Demonstrated Performance	Current Estimate
See Note				
N/A	N/A	N/A	TBD	N/A

Requirements Reference

Operational Requirements Document (ORD) Change 2 dated June 22, 2007

Change Explanations

None

Notes

The JROC has not established KPPs specific to the EMALS subprogram. All existing CVN 78 Class KPPs will be managed in the CVN 78 Class ship subprogram section.

Track to Budget

CVN 78

RDT&E

Appn	BA	PE	
Navy	1319	04	0603512N
	Project	Name	
	10C098	Composite Mast for CVN's (Sunk)	
	2208	CVN 21	(Shared) (Sunk)
	2678	Tech Insertion (Sunk)	
	2693	Ship System Definition (Sunk)	
	4006	CVN 79 (Sunk)	
	9181	Adv Battlestations/DSS (Sunk)	
	9349	Aviation Ship Integration Center (Sunk)	
	9516	Surface Ship Composite Moisture Separators (Sunk)	
	9B57A	Carrier Plant Automation and Manning Reduction (Sunk)	
Navy	1319	04	0603564N
	Project	Name	
	2230	CV Feasibility Studies (Sunk)	
	4230	CVNX 1 (Sunk)	
Navy	1319	04	0603570N
	Project	Name	
	2692	Advance Nuclear Power System/CVN 21 Propulsion Plant Development	
Navy	1319	04	0604112N
	Project	Name	
	2208	CVN 21	
	9999	CVN-78 Shock Trials	
Navy	1319	05	0604567N
	Project	Name	
	2301	Contract Design (Sunk)	
	3108	CVN 80 Total Ship Integration	
	3179	CVN 79 Total Ship Integration	
	4007	CVN 21 LFT&E	
	4008	CVN 21 Total Ship Integration (Sunk)	
	9C20A	Automated Fiber Optic Manufacturing Initiative (Sunk)	

Procurement

Appn	BA	PE	
Navy	1611	02	07029898N
	Line Item	Name	

	2001		Carrier Replacement Program	(Shared)
Navy	1611	02	0204112N	
	Line Item		Name	
	2001		Carrier Replacement Program	(Shared)
Navy	1611	05	0204112N	
	Line Item		Name	
	5110		Outfitting	(Shared)
	5300		Completion of Prior Year Shipbuilding	(Shared) (Sunk)
Navy	1810	01	0204112N	
	Line Item		Name	
	0981		Surface Training Equipment	(Shared)

MILCON

	Appn	BA	PE	
Navy	1205	01	0203176N	
	Project		Name	
	62688500		Pier 11 CVN-78 Power Booms	(Sunk)
Navy	1205	01	0702776N	
	Project		Name	
	32443998		Drydock 8 Electrical Distribution Upgrade	(Sunk)

Acq O&M

	Appn	BA	PE	
Navy	1804	01	0702827N	
	Project		Name	
	1B2B		Ship Operational Support and Training	(Shared)

EMALS**RDT&E**

	Appn	BA	PE	
Navy	1319	04	0603512N	
	Project		Name	
	2208		CVN 21	(Shared) (Sunk)
	4004		EMALS	(Sunk)
	9B58A		Improved Corrosion Protection for EMALS	(Sunk)
	9D24A		EMALS Congressional Add	(Sunk)
Navy	1319	04	0604112N	
	Project		Name	
	4004		EMALS	

Procurement

	Appn	BA	PE	
Navy	1611	02	0204112N	
	Line Item		Name	

2001		Carrier Replacement Program		(Shared)
MILCON				
Appn	BA	PE		
Navy	1205	01	0212176N	
Project		Name		
N0400024		EMALS Facility		
		(Sunk)		

Cost and Funding

Cost Summary - Total Program

Total Acquisition Cost - Total Program							
Appropriation	BY 2000 \$M			BY 2000 \$M	TY \$M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	3875.3	4123.4	--	4080.7	4333.4	4744.6	4794.3
Procurement	24825.9	24357.7	--	23740.7	31748.7	33258.8	38897.5
Flyaway	--	--	--	23734.3	--	--	38888.8
Recurring	--	--	--	20540.6	--	--	34184.6
Non Recurring	--	--	--	3193.7	--	--	4704.2
Support	--	--	--	6.4	--	--	8.7
Other Support	--	--	--	6.4	--	--	8.7
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	0.0	152.0	--	46.2	0.0	208.5	56.9
Acq O&M	0.0	0.0	--	54.4	0.0	0.0	73.8
Total	28701.2	28633.1	N/A	27922.0	36082.1	38211.9	43822.5

Cost and Funding

Cost Summary - CVN 78

Total Acquisition Cost - CVN 78							
Appropriation	BY 2000 \$M			BY 2000 \$M	TY \$M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	3490.6	3472.2	3819.4	3269.5	3923.0	3999.8	3835.4
Procurement	24235.0	22764.3	25040.7	22478.0	30977.4	30808.7	36750.1
Flyaway	--	--	--	22471.6	--	--	36741.4
Recurring	--	--	--	19277.9	--	--	32037.2
Non Recurring	--	--	--	3193.7	--	--	4704.2
Support	--	--	--	6.4	--	--	8.7
Other Support	--	--	--	6.4	--	--	8.7
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	0.0	133.2	146.5	27.4	0.0	187.8	36.2
Acq O&M	0.0	0.0	--	54.4	0.0	0.0	73.8
Total	27725.6	26369.7	N/A	25829.3	34900.4	34996.3	40695.5

Confidence Level

Confidence Level of cost estimate for current APB: 50%

The estimate to support this program, like most cost estimates, is built upon a product-oriented work breakdown structure based on historical actual cost information to the maximum extent possible, and, most importantly, based on conservative assumptions that are consistent with actual demonstrated contractor and government performance for a series of acquisition programs in which we have been successful.

It is difficult to calculate mathematically the precise confidence levels associated with life-cycle cost estimates prepared for Major Defense Acquisition Programs (MDAPs). Based on the rigor in methods used in building estimates, the strong adherence to the collection and use of historical cost information, and the review of applied assumptions, we project that it is about as likely the estimate will prove too low or too high for the program as described.

Total Quantity - CVN 78			
Quantity	SAR Baseline Development Estimate	Current APB Development	Current Estimate
RDT&E	0	0	0
Procurement	3	3	3
Total	3	3	3

Cost Summary - EMALS

Total Acquisition Cost - EMALS							
Appropriation	BY 2000 \$M			BY 2000 \$M	TY \$M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	384.7	651.2	748.9	811.2 ¹	410.4	744.8	958.9
Procurement	590.9	1593.4	1752.7	1262.7	771.3	2450.1	2147.4
Flyaway	--	--	--	1262.7	--	--	2147.4
Recurring	--	--	--	1262.7	--	--	2147.4
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	0.0	--	--	0.0
Other Support	--	--	--	0.0	--	--	0.0
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	0.0	18.8	20.7	18.8	0.0	20.7	20.7
Acq O&M	0.0	0.0	--	0.0	0.0	0.0	0.0
Total	975.6	2263.4	N/A	2092.7	1181.7	3215.6	3127.0

¹ APB Breach

Confidence Level

Confidence Level of cost estimate for current APB: 50%

The estimate to support this program, like most cost estimates, is built upon a product-oriented work breakdown structure based on historical actual cost information to the maximum extent possible, and, most importantly, based on conservative assumptions that are consistent with actual demonstrated contractor and government performance for a series of acquisition programs in which we have been successful.

It is difficult to calculate mathematically the precise confidence levels associated with life-cycle cost estimates prepared for major complex systems. Based on the rigor in methods used in building estimates, the strong adherence to the collection and use of historical cost information, and the review of applied assumptions, we project that it is about as likely the estimate will prove too low or too high for the program as described.

Total Quantity - EMALS			
Quantity	SAR Baseline Development Estimate	Current APB Development	Current Estimate
RDT&E	0	0	0
Procurement	3	3	3
Total	3	3	3

Cost and Funding

Funding Summary - Total Program

Appropriation Summary									
FY 2017 President's Budget / December 2015 SAR (TY\$ M)									
Appropriation	Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	To Complete	Total
RDT&E	4011.7	116.7	121.5	150.0	134.2	90.5	72.2	97.5	4794.3
Procurement	18832.9	2659.9	2668.9	4361.2	1650.2	1736.5	3097.1	3890.8	38897.5
MILCON	56.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.9
Acq O&M	4.8	38.4	14.1	4.8	3.8	3.9	4.0	0.0	73.8
PB 2017 Total	22906.3	2815.0	2804.5	4516.0	1788.2	1830.9	3173.3	3988.3	43822.5
PB 2016 Total	22868.8	2846.9	3068.4	3598.8	2133.0	931.1	2339.6	5174.6	42961.2
Delta	37.5	-31.9	-263.9	917.2	-344.8	899.8	833.7	-1186.3	861.3

Cost and Funding

Funding Summary - CVN 78

Appropriation Summary									
FY 2017 President's Budget / December 2015 SAR (TY\$ M)									
Appropriation	Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	To Complete	Total
RDT&E	3145.1	104.2	83.8	124.0	118.1	90.5	72.2	97.5	3835.4
Procurement	17946.7	2386.0	2434.5	4183.4	1472.3	1609.6	2984.5	3733.1	36750.1
MILCON	36.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.2
Acq O&M	4.8	38.4	14.1	4.8	3.8	3.9	4.0	0.0	73.8
PB 2017 Total	21132.8	2528.6	2532.4	4312.2	1594.2	1704.0	3060.7	3830.6	40695.5
PB 2016 Total	21107.3	2645.1	2913.1	3318.0	1983.0	866.1	2189.6	4645.6	39667.8
Delta	25.5	-116.5	-380.7	994.2	-388.8	837.9	871.1	-815.0	1027.7

Quantity Summary										
FY 2017 President's Budget / December 2015 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	To Complete	Total
Development	0	0	0	0	0	0	0	0	0	0
Production	0	2	0	0	1	0	0	0	0	3
PB 2017 Total	0	2	0	0	1	0	0	0	0	3
PB 2016 Total	0	2	0	0	1	0	0	0	0	3
Delta	0	0	0	0	0	0	0	0	0	0

Funding Summary - EMALS

Appropriation Summary									
FY 2017 President's Budget / December 2015 SAR (TY\$ M)									
Appropriation	Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	To Complete	Total
RDT&E	866.6	12.5	37.7	26.0	16.1	0.0	0.0	0.0	958.9
Procurement	886.2	273.9	234.4	177.8	177.9	126.9	112.6	157.7	2147.4
MILCON	20.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.7
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2017 Total	1773.5	286.4	272.1	203.8	194.0	126.9	112.6	157.7	3127.0
PB 2016 Total	1761.5	201.8	155.3	280.8	150.0	65.0	150.0	529.0	3293.4
Delta	12.0	84.6	116.8	-77.0	44.0	61.9	-37.4	-371.3	-166.4

Quantity Summary										
FY 2017 President's Budget / December 2015 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	To Complete	Total
Development	0	0	0	0	0	0	0	0	0	0
Production	0	2	0	0	1	0	0	0	0	3
PB 2017 Total	0	2	0	0	1	0	0	0	0	3
PB 2016 Total	0	2	0	0	1	0	0	0	0	3
Delta	0	0	0	0	0	0	0	0	0	0

Cost and Funding

Annual Funding By Appropriation - CVN 78

Annual Funding - CVN 78								
1319 RDT&E Research, Development, Test, and Evaluation, Navy								
Fiscal Year	Quantity	TY \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
1997	--	--	--	--	--	--	--	0.9
1998	--	--	--	--	--	--	--	46.1
1999	--	--	--	--	--	--	--	83.3
2000	--	--	--	--	--	--	--	136.8
2001	--	--	--	--	--	--	--	189.5
2002	--	--	--	--	--	--	--	240.5
2003	--	--	--	--	--	--	--	272.4
2004	--	--	--	--	--	--	--	268.8
2005	--	--	--	--	--	--	--	300.3
2006	--	--	--	--	--	--	--	245.5
2007	--	--	--	--	--	--	--	229.5
2008	--	--	--	--	--	--	--	191.5
2009	--	--	--	--	--	--	--	201.8
2010	--	--	--	--	--	--	--	179.6
2011	--	--	--	--	--	--	--	119.9
2012	--	--	--	--	--	--	--	113.3
2013	--	--	--	--	--	--	--	104.3
2014	--	--	--	--	--	--	--	103.8
2015	--	--	--	--	--	--	--	117.3
2016	--	--	--	--	--	--	--	104.2
2017	--	--	--	--	--	--	--	83.8
2018	--	--	--	--	--	--	--	124.0
2019	--	--	--	--	--	--	--	118.1
2020	--	--	--	--	--	--	--	90.5
2021	--	--	--	--	--	--	--	72.2
2022	--	--	--	--	--	--	--	35.6
2023	--	--	--	--	--	--	--	20.3
2024	--	--	--	--	--	--	--	20.6
2025	--	--	--	--	--	--	--	21.0
Subtotal	--	--	--	--	--	--	--	3835.4

Annual Funding - CVN 78								
1319 RDT&E Research, Development, Test, and Evaluation, Navy								
Fiscal Year	Quantity	BY 2000 \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
1997	--	--	--	--	--	--	--	0.9
1998	--	--	--	--	--	--	--	46.9
1999	--	--	--	--	--	--	--	83.7
2000	--	--	--	--	--	--	--	135.5
2001	--	--	--	--	--	--	--	185.1
2002	--	--	--	--	--	--	--	232.6
2003	--	--	--	--	--	--	--	259.6
2004	--	--	--	--	--	--	--	249.2
2005	--	--	--	--	--	--	--	271.3
2006	--	--	--	--	--	--	--	215.1
2007	--	--	--	--	--	--	--	196.2
2008	--	--	--	--	--	--	--	160.8
2009	--	--	--	--	--	--	--	167.3
2010	--	--	--	--	--	--	--	146.7
2011	--	--	--	--	--	--	--	95.7
2012	--	--	--	--	--	--	--	88.9
2013	--	--	--	--	--	--	--	81.0
2014	--	--	--	--	--	--	--	79.5
2015	--	--	--	--	--	--	--	88.7
2016	--	--	--	--	--	--	--	77.5
2017	--	--	--	--	--	--	--	61.2
2018	--	--	--	--	--	--	--	88.9
2019	--	--	--	--	--	--	--	83.0
2020	--	--	--	--	--	--	--	62.4
2021	--	--	--	--	--	--	--	48.8
2022	--	--	--	--	--	--	--	23.6
2023	--	--	--	--	--	--	--	13.2
2024	--	--	--	--	--	--	--	13.1
2025	--	--	--	--	--	--	--	13.1
Subtotal	--	--	--	--	--	--	--	3269.5

Annual Funding - CVN 78 1611 Procurement Shipbuilding and Conversion, Navy							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2001	--	21.7	--	--	21.7	--	21.7
2002	--	135.3	--	--	135.3	--	135.3
2003	--	243.7	--	151.8	395.5	--	395.5
2004	--	955.2	--	207.7	1162.9	--	1162.9
2005	--	274.4	--	348.7	623.1	--	623.1
2006	--	241.6	--	377.3	618.9	--	618.9
2007	--	358.3	--	424.5	782.8	--	782.8
2008	1	1772.3	--	1010.7	2783.0	--	2783.0
2009	--	3663.0	--	54.9	3717.9	--	3717.9
2010	--	830.3	--	251.0	1081.3	--	1081.3
2011	--	1811.0	--	546.3	2357.3	--	2357.3
2012	--	453.6	--	101.2	554.8	--	554.8
2013	1	393.7	--	82.7	476.4	--	476.4
2014	--	1214.8	--	267.3	1482.1	--	1482.1
2015	--	1643.8	--	109.9	1753.7	--	1753.7
2016	--	2232.7	--	148.6	2381.3	--	2381.3
2017	--	2325.3	--	105.2	2430.5	--	2430.5
2018	1	4105.4	--	78.0	4183.4	--	4183.4
2019	--	1374.9	--	97.4	1472.3	--	1472.3
2020	--	1514.4	--	95.2	1609.6	--	1609.6
2021	--	1925.1	968.4	91.0	2984.5	--	2984.5
2022	--	1560.3	--	85.5	1645.8	--	1645.8
2023	--	1651.4	--	69.3	1720.7	--	1720.7
2024	--	69.4	--	--	69.4	--	69.4
2025	--	61.6	--	--	61.6	--	61.6
2026	--	77.7	--	--	77.7	--	77.7
2027	--	140.2	--	--	140.2	--	140.2
2028	--	17.7	--	--	17.7	--	17.7
Subtotal	3	31068.8	968.4	4704.2	36741.4	--	36741.4

Annual Funding - CVN 78 1611 Procurement Shipbuilding and Conversion, Navy							
Fiscal Year	Quantity	BY 2000 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2001	--	19.7	--	--	19.7	--	19.7
2002	--	122.0	--	--	122.0	--	122.0
2003	--	207.7	--	129.4	337.1	--	337.1
2004	--	785.7	--	170.9	956.6	--	956.6
2005	--	216.1	--	274.7	490.8	--	490.8
2006	--	183.8	--	287.1	470.9	--	470.9
2007	--	260.6	--	308.8	569.4	--	569.4
2008	1	1246.8	--	710.9	1957.7	--	1957.7
2009	--	2499.9	--	37.5	2537.4	--	2537.4
2010	--	547.4	--	165.5	712.9	--	712.9
2011	--	1156.3	--	348.8	1505.1	--	1505.1
2012	--	283.2	--	63.2	346.4	--	346.4
2013	1	241.0	--	50.6	291.6	--	291.6
2014	--	729.9	--	160.7	890.6	--	890.6
2015	--	970.8	--	64.9	1035.7	--	1035.7
2016	--	1294.8	--	86.2	1381.0	--	1381.0
2017	--	1323.0	--	59.8	1382.8	--	1382.8
2018	1	2290.4	--	43.5	2333.9	--	2333.9
2019	--	752.0	--	53.3	805.3	--	805.3
2020	--	812.1	--	51.0	863.1	--	863.1
2021	--	1012.0	509.2	47.8	1569.0	--	1569.0
2022	--	804.2	--	44.1	848.3	--	848.3
2023	--	834.5	--	35.0	869.5	--	869.5
2024	--	34.4	--	--	34.4	--	34.4
2025	--	29.9	--	--	29.9	--	29.9
2026	--	37.0	--	--	37.0	--	37.0
2027	--	65.4	--	--	65.4	--	65.4
2028	--	8.1	--	--	8.1	--	8.1
Subtotal	3	18768.7	509.2	3193.7	22471.6	--	22471.6

Navy plans to build 11 CVN 78 Class ships to replace CVN 65 and CVN 68 Class ships.

Cost Quantity Information

The Navy and shipbuilder have made fundamental changes in the manner in which the CVN 79 will be built to incorporate lessons learned from CVN 78 and eliminate the key contributors to cost performance challenges realized in the construction of CVN 78. Further improvements are planned for CVN 80 and have been incorporated into the CVN 80 cost estimates and budgets. The FY 2017 PB for CVN 80 is \$572.0M in TY\$ (\$279.2M in BY\$) less than the FY 2016 PB, and \$974M less than the FY 2015 PB.

The FY 2017 PB introduces the first year of funding for CVN 81; however, it is not in the current APB. An update to the APB will be needed at a later date to add CVN 81 to the program baseline. With the addition of CVN 81 into the FYDP, unit costs will appear to have increased until CVN 81 is added to the APB and the unit cost is adjusted to reflect four ships.

Cost Quantity Information - CVN 78 1611 Procurement Shipbuilding and Conversion, Navy		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2000 \$M
2001	--	--
2002	--	--
2003	--	--
2004	--	--
2005	--	--
2006	--	--
2007	--	--
2008	1	6344.1
2009	--	--
2010	--	--
2011	--	--
2012	--	--
2013	1	6011.3
2014	--	--
2015	--	--
2016	--	--
2017	--	--
2018	1	6413.3
2019	--	--
2020	--	--
2021	--	--
2022	--	--
2023	--	--
2024	--	--
2025	--	--
2026	--	--
2027	--	--
2028	--	--
Subtotal	3	18768.7

Annual Funding - CVN 78							
1810 Procurement Other Procurement, Navy							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2016	--	--	--	--	--	4.7	4.7
2017	--	--	--	--	--	4.0	4.0
Subtotal	--	--	--	--	--	8.7	8.7

Annual Funding - CVN 78							
1810 Procurement Other Procurement, Navy							
Fiscal Year	Quantity	BY 2000 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2016	--	--	--	--	--	3.5	3.5
2017	--	--	--	--	--	2.9	2.9
Subtotal	--	--	--	--	--	6.4	6.4

Annual Funding - CVN 78 1205 MILCON Military Construction, Navy and Marine Corps	
Fiscal Year	TY \$M
	Total Program
2013	32.8
2014	3.4
Subtotal	36.2

Annual Funding - CVN 78 1205 MILCON Military Construction, Navy and Marine Corps	
Fiscal Year	BY 2000 \$M
	Total Program
2013	24.9
2014	2.5
Subtotal	27.4

Annual Funding - CVN 78 1804 Acq O&M Operation and Maintenance, Navy	
Fiscal Year	TY \$M
	Total Program
2015	4.8
2016	38.4
2017	14.1
2018	4.8
2019	3.8
2020	3.9
2021	4.0
Subtotal	73.8

Annual Funding - CVN 78 1804 Acq O&M Operation and Maintenance, Navy	
Fiscal Year	BY 2000 \$M
	Total Program
2015	3.6
2016	28.8
2017	10.4
2018	3.5
2019	2.7
2020	2.7
2021	2.7
Subtotal	54.4

Annual Funding By Appropriation - EMALS

Annual Funding - EMALS							
1319 RDT&E Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2000	--	--	--	--	--	--	41.0
2001	--	--	--	--	--	--	41.0
2002	--	--	--	--	--	--	41.0
2003	--	--	--	--	--	--	44.2
2004	--	--	--	--	--	--	37.2
2005	--	--	--	--	--	--	49.4
2006	--	--	--	--	--	--	56.8
2007	--	--	--	--	--	--	108.2
2008	--	--	--	--	--	--	40.5
2009	--	--	--	--	--	--	113.2
2010	--	--	--	--	--	--	90.9
2011	--	--	--	--	--	--	59.1
2012	--	--	--	--	--	--	31.0
2013	--	--	--	--	--	--	54.9
2014	--	--	--	--	--	--	46.9
2015	--	--	--	--	--	--	11.3
2016	--	--	--	--	--	--	12.5
2017	--	--	--	--	--	--	37.7
2018	--	--	--	--	--	--	26.0
2019	--	--	--	--	--	--	16.1
Subtotal	--	--	--	--	--	--	958.9

Annual Funding - EMALS							
1319 RDT&E Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 2000 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2000	--	--	--	--	--	--	40.6
2001	--	--	--	--	--	--	40.0
2002	--	--	--	--	--	--	39.6
2003	--	--	--	--	--	--	42.1
2004	--	--	--	--	--	--	34.5
2005	--	--	--	--	--	--	44.6
2006	--	--	--	--	--	--	49.8
2007	--	--	--	--	--	--	92.5
2008	--	--	--	--	--	--	34.0
2009	--	--	--	--	--	--	93.9
2010	--	--	--	--	--	--	74.3
2011	--	--	--	--	--	--	47.2
2012	--	--	--	--	--	--	24.3
2013	--	--	--	--	--	--	42.6
2014	--	--	--	--	--	--	35.9
2015	--	--	--	--	--	--	8.5
2016	--	--	--	--	--	--	9.3
2017	--	--	--	--	--	--	27.6
2018	--	--	--	--	--	--	18.6
2019	--	--	--	--	--	--	11.3
Subtotal	--	--	--	--	--	--	811.2

Annual Funding - EMALS							
1611 Procurement Shipbuilding and Conversion, Navy							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2007	--	5.8	--	--	5.8	--	5.8
2008	1	25.6	--	--	25.6	--	25.6
2009	--	177.2	--	--	177.2	--	177.2
2010	--	138.6	--	--	138.6	--	138.6
2011	--	257.5	--	--	257.5	--	257.5
2012	--	--	--	--	--	--	--
2013	1	17.8	--	--	17.8	--	17.8
2014	--	65.3	--	--	65.3	--	65.3
2015	--	198.4	--	--	198.4	--	198.4
2016	--	273.9	--	--	273.9	--	273.9
2017	--	234.4	--	--	234.4	--	234.4
2018	1	177.8	--	--	177.8	--	177.8
2019	--	177.9	--	--	177.9	--	177.9
2020	--	126.9	--	--	126.9	--	126.9
2021	--	112.6	--	--	112.6	--	112.6
2022	--	87.8	--	--	87.8	--	87.8
2023	--	69.9	--	--	69.9	--	69.9
Subtotal	3	2147.4	--	--	2147.4	--	2147.4

Annual Funding - EMALS							
1611 Procurement Shipbuilding and Conversion, Navy							
Fiscal Year	Quantity	BY 2000 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2007	--	4.2	--	--	4.2	--	4.2
2008	1	18.0	--	--	18.0	--	18.0
2009	--	120.9	--	--	120.9	--	120.9
2010	--	91.4	--	--	91.4	--	91.4
2011	--	164.4	--	--	164.4	--	164.4
2012	--	--	--	--	--	--	--
2013	1	10.9	--	--	10.9	--	10.9
2014	--	39.2	--	--	39.2	--	39.2
2015	--	117.2	--	--	117.2	--	117.2
2016	--	158.8	--	--	158.8	--	158.8
2017	--	133.4	--	--	133.4	--	133.4
2018	1	99.2	--	--	99.2	--	99.2
2019	--	97.3	--	--	97.3	--	97.3
2020	--	68.0	--	--	68.0	--	68.0
2021	--	59.2	--	--	59.2	--	59.2
2022	--	45.3	--	--	45.3	--	45.3
2023	--	35.3	--	--	35.3	--	35.3
Subtotal	3	1262.7	--	--	1262.7	--	1262.7

Cost Quantity Information

The Navy was successful in using Firm Fixed Price (FFP) Contracting for EMALS on the CVN 78 to control costs and has utilized the same contracting approach on the CVN 79.

Cost Quantity Information - EMALS 1611 Procurement Shipbuilding and Conversion, Navy		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2000 \$M
2007	--	--
2008	1	438.2
2009	--	--
2010	--	--
2011	--	--
2012	--	--
2013	1	424.0
2014	--	--
2015	--	--
2016	--	--
2017	--	--
2018	1	400.5
2019	--	--
2020	--	--
2021	--	--
2022	--	--
2023	--	--
Subtotal	3	1262.7

Annual Funding - EMALS 1205 MILCON Military Construction, Navy and Marine Corps		
Fiscal Year	TY \$M	
	Total Program	
2004		20.7
Subtotal		20.7

Annual Funding - EMALS 1205 MILCON Military Construction, Navy and Marine Corps		
Fiscal Year	BY 2000 \$M	
	Total Program	
2004		18.8
Subtotal		18.8

Low Rate Initial Production

CVN 78

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	4/26/2004	4/26/2004
Approved Quantity	3	3
Reference	Milestone B ADM	Milestone B ADM
Start Year	2004	2004
End Year	2018	2018

The Current Total LRIP Quantity is more than 10% of the total production quantity due to the ADM dated April 26, 2004 approving three ships.

EMALS

EMALS has no LRIP quantities because the current LRIP decision occurred prior to the establishment of EMALS as a major subprogram.

Foreign Military Sales

CVN 78

Notes

The Navy has initiated discussions with the Government of India under the DTTI through the JWGACTC about assistance in the construction of an indigenous 65,000 ton aircraft carrier. The discussions are in the early stages and are coordinated through USD(AT&L) International Cooperation and the NIPO. The Program is determining disclosure and other exportability considerations that may impact cooperation/sales. A Critical Program Information assessment has been completed and the Program Office is working with NIPO to develop the necessary documentation to complete a Technology Transfer and Security Assistance Review Board in CY 2016.

EMALS

Notes

The Navy has initiated discussions with the Government of India under the DTTI through the JWGACTC about assistance in the construction of an indigenous 65,000 ton aircraft carrier. The discussions are in the early stages and are coordinated through USD(AT&L) International Cooperation and the NIPO. The Program is determining disclosure and other exportability considerations that may impact cooperation/sales. A Critical Program Information assessment has been completed and the Program Office is working with NIPO to develop the necessary documentation to complete a Technology Transfer and Security Assistance Review Board in CY 2016.

Acronyms and Abbreviations

DTTI - Defense Technology and Trade Initiative
JWGACTC - Joint Working Group on Aircraft Carrier Technology Cooperation
NIPO - Navy International Programs Office

Nuclear Costs

CVN 78

Nuclear Research and Development and Reactor Plant Government Furnished Equipment costs are included within the program costs in this report; however, Department of Energy nuclear costs are not included in this report.

Shipbuilding & Conversion Navy Nuclear Propulsion Equipment Cost is \$6,221.0M in TY dollars for the CVN 78 Class Aircraft Carriers (CVN 78-80).

EMALS

None

Unit Cost

CVN 78

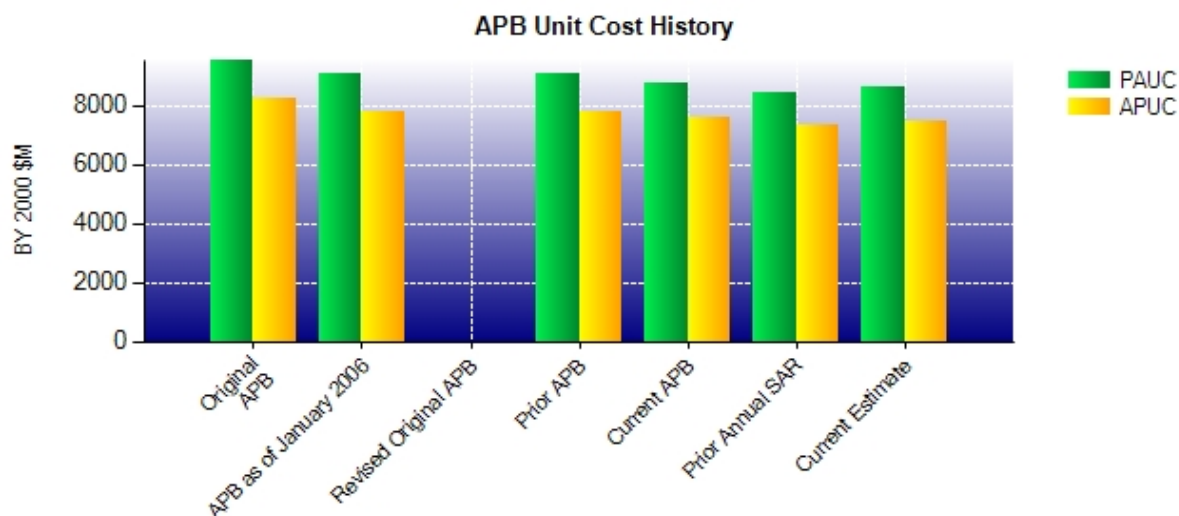
Unit Cost Report

Item	BY 2000 \$M	BY 2000 \$M	% Change
	Current UCR Baseline (Apr 2013 APB)	Current Estimate (Dec 2015 SAR)	
Program Acquisition Unit Cost			
Cost	26369.7	25829.3	
Quantity	3	3	
Unit Cost	8789.900	8609.767	-2.05
Average Procurement Unit Cost			
Cost	22764.3	22478.0	
Quantity	3	3	
Unit Cost	7588.100	7492.667	-1.26

Item	BY 2000 \$M	BY 2000 \$M	% Change
	Original UCR Baseline (Apr 2004 APB)	Current Estimate (Dec 2015 SAR)	
Program Acquisition Unit Cost			
Cost	28701.2	25829.3	
Quantity	3	3	
Unit Cost	9567.067	8609.767	-10.01
Average Procurement Unit Cost			
Cost	24825.9	22478.0	
Quantity	3	3	
Unit Cost	8275.300	7492.667	-9.46

CVN 78

Unit Cost History



Item	Date	BY 2000 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Apr 2004	9567.067	8275.300	12027.367	10582.900
APB as of January 2006	Aug 2005	9068.800	7778.000	12004.400	10526.633
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	Nov 2007	9068.800	7778.000	12004.400	10526.633
Current APB	Apr 2013	8789.900	7588.100	11665.433	10269.567
Prior Annual SAR	Dec 2014	8414.567	7366.800	13222.600	12005.733
Current Estimate	Dec 2015	8609.767	7492.667	13565.167	12250.033

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY \$M)									
Initial PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
11633.467	2145.467	0.000	279.833	-27.067	-469.433	0.000	2.900	1931.700	13565.167

Current SAR Baseline to Current Estimate (TY \$M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
10325.800	2113.300	0.000	222.467	132.967	-547.400	0.000	2.900	1924.234	12250.033

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone I	N/A	N/A	N/A	N/A
Milestone B	N/A	Apr 2004	N/A	Apr 2004
Milestone C	N/A	Mar 2017	N/A	Oct 2017
IOC	N/A	Sep 2015	N/A	Oct 2017
Total Cost (TY \$M)	N/A	34900.4	N/A	40695.5
Total Quantity	N/A	3	N/A	3
PAUC	N/A	11633.467	N/A	13565.167

EMALS

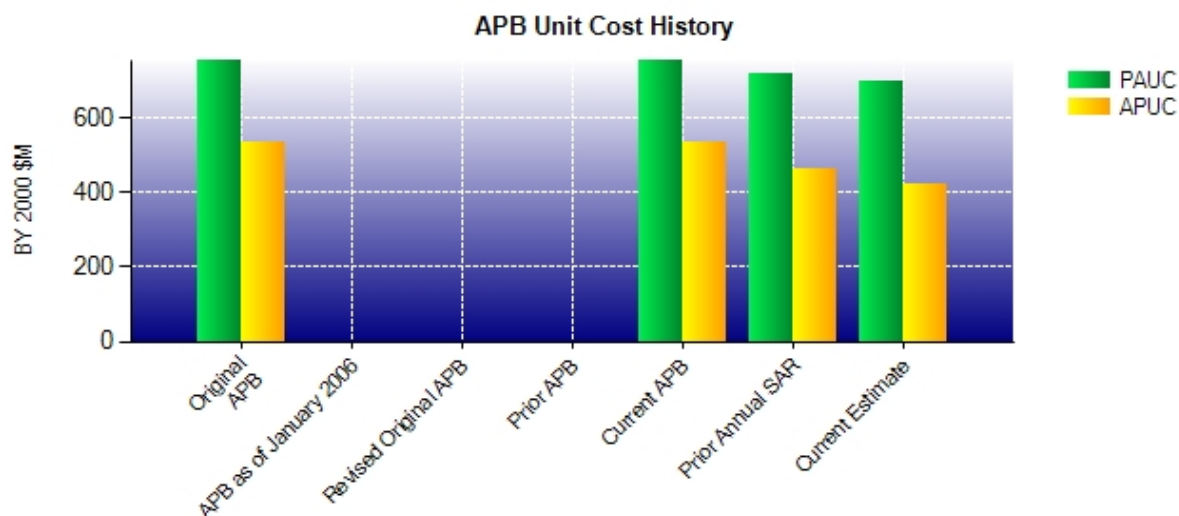
Unit Cost Report

Item	BY 2000 \$M	BY 2000 \$M	% Change
	Current UCR Baseline (Apr 2013 APB)	Current Estimate (Dec 2015 SAR)	
Program Acquisition Unit Cost			
Cost	2263.4	2092.7	
Quantity	3	3	
Unit Cost	754.467	697.567	-7.54
Average Procurement Unit Cost			
Cost	1593.4	1262.7	
Quantity	3	3	
Unit Cost	531.133	420.900	-20.75

Item	BY 2000 \$M	BY 2000 \$M	% Change
	Original UCR Baseline (Apr 2013 APB)	Current Estimate (Dec 2015 SAR)	
Program Acquisition Unit Cost			
Cost	2263.4	2092.7	
Quantity	3	3	
Unit Cost	754.467	697.567	-7.54
Average Procurement Unit Cost			
Cost	1593.4	1262.7	
Quantity	3	3	
Unit Cost	531.133	420.900	-20.75

EMALS

Unit Cost History



Item	Date	BY 2000 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Apr 2013	754.467	531.133	1071.867	816.700
APB as of January 2006	N/A	N/A	N/A	N/A	N/A
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	N/A	N/A	N/A	N/A	N/A
Current APB	Apr 2013	754.467	531.133	1071.867	816.700
Prior Annual SAR	Dec 2014	718.000	460.267	1097.800	797.300
Current Estimate	Dec 2015	697.567	420.900	1042.333	715.800

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY \$M)									
Initial PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
393.900	164.967	0.000	0.000	0.000	483.466	0.000	0.000	648.433	1042.333

Current SAR Baseline to Current Estimate (TY \$M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
257.100	156.400	0.000	0.000	0.000	302.300	0.000	0.000	458.700	715.800

SAR Baseline History					
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate	
Milestone A	N/A	N/A	N/A	N/A	N/A
Milestone B	N/A	N/A	N/A	N/A	N/A
Milestone C	N/A	N/A	N/A	N/A	N/A
IOC	N/A	Sep 2016	N/A	Oct 2017	
Total Cost (TY \$M)	N/A	1181.7	N/A	3127.0	
Total Quantity	N/A	3	N/A	3	
PAUC	N/A	393.900	N/A	1042.333	

Cost Variance

CVN 78

Summary TY \$M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Development Estimate)	3923.0	30977.4	--	--	34900.4
Previous Changes					
Economic	+100.7	+6291.0	+0.3	-0.2	+6391.8
Quantity	--	--	--	--	--
Schedule	+172.1	+667.4	--	--	+839.5
Engineering	-480.1	+398.9	--	--	-81.2
Estimating	-192.0	-2317.5	+35.9	+90.9	-2382.7
Other	--	--	--	--	--
Support	--	--	--	--	--
Subtotal	-399.3	+5039.8	+36.2	+90.7	+4767.4
Current Changes					
Economic	-3.4	+48.9	-0.1	-0.8	+44.6
Quantity	--	--	--	--	--
Schedule	--	--	--	--	--
Engineering	--	--	--	--	--
Estimating	+315.1	+675.3	+0.1	-16.1	+974.4
Other	--	--	--	--	--
Support	--	+8.7	--	--	+8.7
Subtotal	+311.7	+732.9	--	-16.9	+1027.7
Total Changes	-87.6	+5772.7	+36.2	+73.8	+5795.1
CE - Cost Variance	3835.4	36750.1	36.2	73.8	40695.5
CE - Cost & Funding	3835.4	36750.1	36.2	73.8	40695.5

Summary BY 2000 \$M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Development Estimate)	3490.6	24235.0	--	--	27725.6
Previous Changes					
Economic	--	--	--	--	--
Quantity	--	--	--	--	--
Schedule	+120.2	--	--	--	+120.2
Engineering	-352.4	+187.7	--	--	-164.7
Estimating	-208.9	-2322.3	+27.3	+66.5	-2437.4
Other	--	--	--	--	--
Support	--	--	--	--	--
Subtotal	-441.1	-2134.6	+27.3	+66.5	-2481.9
Current Changes					
Economic	--	--	--	--	--
Quantity	--	--	--	--	--
Schedule	--	--	--	--	--
Engineering	--	--	--	--	--
Estimating	+220.0	+371.2	+0.1	-12.1	+579.2
Other	--	--	--	--	--
Support	--	+6.4	--	--	+6.4
Subtotal	+220.0	+377.6	+0.1	-12.1	+585.6
Total Changes	-221.1	-1757.0	+27.4	+54.4	-1896.3
CE - Cost Variance	3269.5	22478.0	27.4	54.4	25829.3
CE - Cost & Funding	3269.5	22478.0	27.4	54.4	25829.3

Previous Estimate: December 2014

RDT&E		\$M	
Current Change Explanations		Base Year	Then Year
Revised escalation indices. (Economic)		N/A	-3.4
Adjustment for current and prior escalation. (Estimating)		+1.2	+1.5
Revised estimate for CVN 78 Class (Ford Class Design) for the identification and development of initiatives to reduce construction costs. (Estimating)		+110.8	+161.7
Revised estimate for CVN 78 shock testing. (Estimating)		+68.7	+97.2
Congressional increase in FY 2016 for CVN 78 shock testing. (Estimating)		+37.2	+50.0
Congressional reduction in FY 2016 for CVN 78 due to program under-execution. (Estimating)		-0.4	-0.5
Congressional reduction in FY 2016 for CVN 79 due to program under-execution. (Estimating)		-1.2	-1.6
Congressional reduction in FY 2016 to CVN 80 for radar integration ahead of need. (Estimating)		-5.2	-7.0
Revised estimate for CVN 78 non-pay, non-fuel purchase rate adjustments. (Estimating)		-1.9	-2.6
Revised estimate for CVN 79 non-pay, non-fuel purchase rate adjustments. (Estimating)		-0.5	-0.8
Revised estimate for CVN 80 non-pay, non-fuel purchase rate adjustments. (Estimating)		-1.6	-2.2
Revised estimate for CVN 78 as a result of miscellaneous adjustments. (Estimating)		-1.2	-1.4
Revised estimate for CVN 79 as a result of miscellaneous adjustments. (Estimating)		-0.3	-0.4
Revised estimate for CVN 80 as a result of miscellaneous adjustments. (Estimating)		-0.5	-0.6
Revised estimates in the outyears for Operational Test & Evaluation and Live Fire Test & Evaluation due to CVN 78 Delivery effort shift. (Estimating)		+13.6	+19.9
Revised estimate due to application of new outyear escalation indices. (Estimating)		+1.3	+1.9
RDT&E Subtotal		+220.0	+311.7

Procurement		\$M	
Current Change Explanations		Base Year	Then Year
Revised escalation indices. (Economic)		N/A	+48.9
Adjustment for current and prior escalation. (Estimating)		-12.5	-20.8
Revised estimate for CVN 78 Outfitting/Post Delivery (OF/PD). (Estimating)		+15.5	+26.5
Revised estimate for CVN 79 OF/PD. (Estimating)		+3.1	+6.2
Revised estimate for CVN 79 to fund to the PM's Estimate at Completion of \$11.498B. (Estimating)		+83.9	+150.4
Revised estimate for CVN 79 to align with revised cost cap of \$11.398B. (Estimating)		-31.2	-38.4
Congressional Reduction in FY 2016 for CVN 79 for Ship's Signal Exploitation Equipment hardware and tech services cost growth. (Estimating)		-0.9	-1.6
Congressional reduction in FY 2016 for CVN 79 for High Frequency Radio cost growth. (Estimating)		-1.6	-2.8
Congressional reduction in FY 2016 for CVN 79 due to other electronics cost growth. (Estimating)		-2.5	-4.3
Congressional reduction in FY 2016 for CVN 79 for MK-29 launching system hardware cost growth. (Estimating)		-1.7	-3.0
Congressional reduction in FY 2016 for CVN 79 for Hull Mechanical & Engineering (HM&E) engineering services growth. (Estimating)		-2.0	-3.5

Congressional reduction in FY 2016 for CVN 79 due to program cost growth. (Estimating)	-2.0	-3.5
Congressional reduction in FY 2016 for CVN 80 to defer non-nuclear long lead material. (Estimating)	-7.1	-12.3
Revised estimate for CVN 79 due to miscellaneous adjustments. (Estimating)	+0.2	+0.2
Revised estimate for CVN 80 due to miscellaneous adjustments. (Estimating)	+5.1	+9.4
Decrease to CVN 80 due to realized efficiencies from optimizing the build sequence and re-phasing funding into earlier years of execution. (Estimating)	-105.7	-252.0
Revised estimate for CVN 80 non-pay, non-fuel purchase rate adjustments. (Estimating)	-63.4	-115.5
Revised estimate due to the addition of first year of Advance Procurement for CVN 81. (Estimating)	+509.1	+968.4
Revised estimate due to application of new outyear escalation indices. (Estimating)	-15.1	-28.1
Increase in Other Support to procure CVN 78 classroom training equipment for new Contractor Furnished Equipment Systems. (Support)	+6.4	+8.7
Procurement Subtotal	+377.6	+732.9

MILCON	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-0.1
Adjustment for current and prior escalation. (Estimating)	+0.1	+0.1
MILCON Subtotal	+0.1	0.0

Acq O&M	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-0.8
Adjustment for current and prior escalation. (Estimating)	+0.3	+0.4
Revised estimate for CVN 78 Life Cycle training system development. (Estimating)	+2.9	+3.9
Revised estimate for CVN 78 sustainment funding. (Estimating)	-13.3	-18.0
Revised estimate due to miscellaneous adjustments. (Estimating)	-5.0	-6.8
Revised estimate for CVN 78 outyear estimates. (Estimating)	+2.7	+4.0
Revised estimate due to application of new outyear escalation indices. (Estimating)	+0.3	+0.4
Acq O&M Subtotal	-12.1	-16.9

Cost Variance

EMALS

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	410.4	771.3	--	1181.7
Previous Changes				
Economic	+26.1	+465.8	--	+491.9
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+444.3	+1154.8	+20.7	+1619.8
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+470.4	+1620.6	+20.7	+2111.7
Current Changes				
Economic	-0.4	+3.4	--	+3.0
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+78.5	-247.9	--	-169.4
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+78.1	-244.5	--	-166.4
Total Changes	+548.5	+1376.1	+20.7	+1945.3
CE - Cost Variance	958.9	2147.4	20.7	3127.0
CE - Cost & Funding	958.9	2147.4	20.7	3127.0

Summary BY 2000 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	384.7	590.9	--	975.6
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+369.7	+789.9	+18.8	+1178.4
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+369.7	+789.9	+18.8	+1178.4
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+56.8	-118.1	--	-61.3
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+56.8	-118.1	--	-61.3
Total Changes	+426.5	+671.8	+18.8	+1117.1
CE - Cost Variance	811.2	1262.7	18.8	2092.7
CE - Cost & Funding	811.2	1262.7	18.8	2092.7

Previous Estimate: December 2014

RDT&E	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-0.4
Adjustment for current and prior escalation. (Estimating)	+0.3	+0.4
Revised estimate to support Integrated Test & Evaluation efforts. (Estimating)	+53.0	+73.3
Revised estimate to support land based testing efforts. (Estimating)	+2.5	+3.3
Revised estimate due to miscellaneous adjustments. (Estimating)	+1.0	+1.5
RDT&E Subtotal	+56.8	+78.1

Procurement	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+3.4
Adjustment for current and prior escalation. (Estimating)	-0.9	-1.4
Congressional reduction in FY 2016 due to CVN 79 EMALS program cost growth. (Estimating)	-23.1	-46.5
Revised estimate for CVN 80 EMALS. (Estimating)	-93.1	-198.0
Revised estimate due to application of new outyear escalation indices. (Estimating)	-1.0	-2.0
Procurement Subtotal	-118.1	-244.5

Contracts

Contract Identification

Appropriation: Procurement
Contract Name: CVN 78 DETAIL DESIGN & CONSTRUCTION (DD&C)
Contractor: Huntington Ingalls Industries (HII) Newport News Shipbuilding (NNS)
Contractor Location: 4101 Washington Avenue
 Newport News, VA 23607-2734
Contract Number: N00024-08-C-2110
Contract Type: Cost Plus Award Fee (CPAF), Cost Plus Incentive Fee (CPIF), Cost Plus Fixed Fee (CPFF)
Award Date: September 10, 2008
Definitization Date: September 10, 2008

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
4910.5	N/A	1	6063.0	N/A	1	6928.3	6911.0

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the award of a new contract structure for Non-Recurring Engineering (NRE) and adjudicated change orders, procurement of special tooling and test equipment, and NRE associated with design and integration of developmental systems.

Contract Variance			
Item	Cost Variance		Schedule Variance
Cumulative Variances To Date (12/31/2015)	-1063.1		-79.5
Previous Cumulative Variances	-876.7		-67.2
Net Change	-186.4		-12.3

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to material cost growth (21%), labor inefficiencies (32%), Overhead degradation (49%), and Facilities Capital Cost of Money (FCCM) improvement (-2%). The material variances are attributed to impacts associated with a "first of class" specification on contractor furnished direct material costs (e.g. valves, electrical components), and increases in vendor services cost for supporting completion of new developmental systems (e.g. advanced weapons elevators, plasma arc waste disposal system). Labor inefficiencies are the result of unanticipated challenges with vendor equipment (e.g. advanced weapons elevators, oxygen plant), design changes (e.g. advanced weapons elevator, EMALS), and producibility issues (e.g. thin plate steel, JP-5 corrosion resistant steel piping, weld distortion, and the increased use of temporary structures and rigging). Additionally, increased supervision and additional recurring engineering costs have been required to manage the above challenges. Contributing to the Cost Variance (CV) are schedule impacts due to planning/budgeting integration efforts to accurately apply distributed budgets to both current and future work.

The unfavorable net change in the schedule variance is due to unanticipated challenges with completing developmental systems, and the complexity of managing and integrating a large volume of work. Although shipbuilder actions to resolve "first of class" issues have retired some technical and schedule risk, HII-NNS was unable to retire all schedule risk, resulting in a four month delay to the launch of CVN 78, with associated impact to delivery. The Navy agreed to delay the delivery date accordingly while HII-NNS has increased material funds to facilitate additional Leased Labor for system and compartment finalization. Contributing to the Schedule Variance (SV) are schedule impacts due to planning/budgeting integration efforts to accurately apply distributed budgets to both current and future work.

Notes

The Program Manager's Estimated Price at Completion (PMEPAC) of \$6,911M exceeds the current Target Price of \$6,063M by \$848M. This total includes \$740M of contractor performance based variance and \$108M of authorized work that has not yet been adjudicated. Both the PMEPAC and the current cumulative cost variance include this \$108M of authorized unadjudicated work. Upon adjudication, this work will be moved to target leaving a Price Variance at Completion of \$740M. The Cost VAC has increased to \$1,018M for the reasons described above. The government liability for this cost variance is \$740M based on share line ratios which reduce the contractor's target fee as cost increases.

Contract Identification

Appropriation: Procurement
Contract Name: CVN 79 Construction Preparation (CP)
Contractor: Huntington Ingalls Industries (HII) Newport News Shipbuilding (NNS)
Contractor Location: 4101 Washington Avenue
 Newport News, VA 23607-2734
Contract Number: N00024-09-C-2116
Contract Type: Cost Plus Fixed Fee (CPFF), Cost Plus Incentive Fee (CPIF)
Award Date: January 15, 2009
Definitization Date: December 08, 2010

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
373.5	N/A	N/A	4237.0	N/A	N/A	4298.6	4295.4

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to award of CVN 79 CP contract extensions for FY 2011 through FY 2014 efforts, a modification awarded on June 5, 2015 which includes the remaining component and steel fabrication and, multiple modifications for procurement of additional material to support the CVN 79 procurement strategy.

Contract Variance			
Item	Cost Variance	Schedule Variance	
Cumulative Variances To Date (12/31/2015)	+57.3	+3.5	
Previous Cumulative Variances	+12.2	+0.4	
Net Change	+45.1	+3.1	

Cost and Schedule Variance Explanations

The favorable net change in the cost variance is due to meeting performance challenges in the manufacturing and assembly process areas that were achieved through improvement initiatives.

The favorable net change in the schedule variance is due to the shipbuilder's execution of the material procurement plan focused on shipset procurements where possible. There was a slight degradation associated with labor performance as the shipbuilder's primary focus has been on achieving cost challenges. Mitigation plans are in place to address schedule variances in fabrication, assembly, and engineering.

Notes

A \$941M modification was awarded on June 5, 2015 which includes the remaining component and steel fabrication, and selected construction unit assemblies already underway where proven performance results were available. As of December 31, 2015, the CP contract is 59.1% complete based on dollars.

Contract Identification

Appropriation: Procurement
Contract Name: CVN 79 Detail Design & Construction
Contractor: Huntington Ingalls Industries (HII) Newport News Shipbuilding (NNS)
Contractor Location: 4101 Washington Ave
 Newport News, VA 23607
Contract Number: N00024-15-C-2114
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: June 05, 2015
Definitization Date: June 05, 2015

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
3352.6	N/A	1	3352.6	N/A	1	3352.6	3296.7

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2015)	-4.9	+13.1
Previous Cumulative Variances	--	--
Net Change	-4.9	+13.1

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to initial challenges in ship integration and engineering, and material charges for support, maintenance and facilities with only 2.6% of contract complete.

The favorable cumulative schedule variance is due to efficient performance in planning and engineering, with only 2.6% of contract complete.

Notes

This is the first time this contract is being reported.

The Navy awarded a FPIF contract in the amount of \$3.35B for the CVN 79 Detail Design & Construction effort. As of December 31, 2015, the DD&C contract is 2.6% complete based on dollars.

Contract Identification

Appropriation: RDT&E
Contract Name: EMALS Basic Ordering Agreement Logistics Development Order
Contractor: General Atomics Electromagnetic Systems Group
Contractor Location: San Diego, CA 92121-1122
Contract Number: N68335-11-G-0003
Contract Type: Cost Plus Fixed Fee (CPFF)
Award Date: August 12, 2012
Definitization Date: August 12, 2012

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
44.5	N/A	1	44.6	N/A	1	46.8	51.2

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to contract modifications to incorporate changes to logistics products due to two EMALS specification change notices.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2015)	-1.6	-1.5
Previous Cumulative Variances	+0.6	-1.8
Net Change	-2.2	+0.3

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to technical manual development which experienced reduced efficiency due to newly hired, inexperienced personnel. Rework of maintenance task analyses and technical manuals due to engineering changes were also contributors.

The favorable net change in the schedule variance is due to technical manual development. Past due fault isolation data module development tasks were completed.

Notes

The Program Manager's Estimated Price at Completion (PMEPAC) currently exceeds the Current Contract Price by \$6.6M. An Integrated Baseline Review (IBR) was conducted in December 2013 that yielded 27 findings. A PMEPAC of \$63.3M was established based on the cost and schedule risks associated with the IBR findings. General Atomics took corrective action to address all IBR findings and the IBR was closed in December 2014. Naval Air Systems Command subsequently conducted a Schedule Risk Assessment and an updated Estimate at Completion the results of which represent a \$12.1M reduction in the PMEPAC to \$51.2M. This order is currently 81.5% complete.

Deliveries and Expenditures

CVN 78

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	0	0	3	0.00%
Total Program Quantity Delivered	0	0	3	0.00%

Expended and Appropriated (TY \$M)

Total Acquisition Cost	40695.5	Years Appropriated	20
Expended to Date	19132.8	Percent Years Appropriated	62.50%
Percent Expended	47.01%	Appropriated to Date	23661.4
Total Funding Years	32	Percent Appropriated	58.14%

The above data is current as of February 25, 2016.

EMALS

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	0	0	3	0.00%
Total Program Quantity Delivered	0	0	3	0.00%

Expended and Appropriated (TY \$M)

Total Acquisition Cost	3127.0	Years Appropriated	17
Expended to Date	1215.0	Percent Years Appropriated	70.83%
Percent Expended	38.86%	Appropriated to Date	2059.9
Total Funding Years	24	Percent Appropriated	65.87%

The above data is current as of February 25, 2016.

Operating and Support Cost

CVN 78

Cost Estimate Details

Date of Estimate:	March 02, 2016
Source of Estimate:	POE
Quantity to Sustain:	3
Unit of Measure:	Ship
Service Life per Unit:	50.00 Years
Fiscal Years in Service:	FY 2017 - FY 2077

The current APB Objective/Threshold values and current estimate reflects Total O&S costs for three ships in accordance with the current Program of Record. The CVN 78 Class Program is planned for a total of 11 ships over a 50 year service life.

O&S costs are developed at the ship level, on an annual cost per ship basis by cost category and appropriation, with total and annual average cost over the ship's expected service life. Costs are estimated for all categories listed in the CAPE Operating and Support Cost Estimating Guide using historical data from operating carrier classes and the Chief of Naval Operations (OPNAV) "Maintenance" Notices. Maintenance and Personnel costs are the major contributors to the total O&S Program.

Sustainment Strategy

Sustainment strategy includes nuclear aircraft carrier certified Naval Shipyards (Newport News Shipyard (NNSY), Puget Sound Naval Shipyard (PSNSY) & Intermediate Maintenance Facility (IMF)) and/or Huntington-Ingalls, Inc - Newport News Shipyard (HII-NNS) for Depot-level Maintenance in concert with regional multi-ship/multi-option (MSMO) contractors, Intermediate-level activities (e.g., Mid-Atlantic Regional Maintenance Center (MARMC), Southwest Regional Maintenance Center (SWRMC)), Organizational-level maintenance strategies, and the employment of existing shore support to the maximum extent possible.

Antecedent Information

The CVN 68 O&S costs were derived from requirements, actual returns, and the Naval Visibility and Management of Operating and Support Costs (VAMOSC) database, with the primary focus using requirements. Unit Level Manpower (1.0) was based on authorized billets (3,291) as detailed in the CVN 68 Ship Manpower Document (SMD); the billets were multiplied against the OSD composite rates for calculating the unit level manpower. Indirect Support (6.0) was based on authorized billets (3,291) as detailed in the CVN 68 SMD; the billets were multiplied against the Naval Center for Cost Analysis (NCCA) Manpower Cost Estimating Tool for Enhanced Online Reporting (METEOR) rates for calculating the indirect support cost. Depot Maintenance (3.3) was derived from OPNAV Note 4700 (dated June 8, 2015).

Unit Operations (2.0), Intermediate Maintenance (3.2), Sustaining Support (4.0), and Continuing System Improvements (5.0) were derived from VAMOSC, with data pulled from FY 2000 through FY 2010; using full year data and excluding CVN 73 which was a forward deployed ship starting in 2008.

Annual O&S Costs BY2000 \$M		
Cost Element	CVN 78 Average Annual Cost Per Ship	CVN 68 Class (Antecedent) Average Annual Cost Per Ship
Unit-Level Manpower	129.020	162.738
Unit Operations	10.130	10.241
Maintenance	101.286	130.099
Sustaining Support	10.853	11.818
Continuing System Improvements	20.163	23.600
Indirect Support	119.520	151.083
Other	0.000	0.000
Total	390.972	489.579

Item	Total O&S Cost \$M		
	CVN 78		CVN 68 Class (Antecedent)
	Current Development APB Objective/Threshold	Current Estimate	
Base Year	55600.0	61160.0	58645.8
Then Year	251600.0	N/A	180995.0
			244789.7
			N/A

Total O&S cost for 11 ships would be \$215,034.69M BY dollars/\$1,041,643.00M in TY dollars.

Equation to Translate Annual Cost to Total Cost

Total Cost = Average Annual Cost Per Ship * Number of Ships * Service Life = \$390.972 * 3 * 50 = \$58,645.83M

O&S Cost Variance		
Category	BY 2000 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2014 SAR	48009.8	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	1425.0	Updated to reflect updated OPNAV 4700 Note dated June 08, 2015.
Cost Data Update	321.2	Update to reflect updated VAMOSOC data from FY 2000-FY 2014.
Labor Rate	7539.8	Updated to reflect revised labor and health benefit rates.
Energy Rate	0.0	
Technical Input	1350.0	Added software maintenance costs for Advanced Arresting Gear (AAG), Ship Self Defense System (SSDS), Enterprise Air Surveillance Radar (EASR), and Machinery Control and Monitoring System (MCMS).
Other	0.0	
Total Changes	10636.0	

Current Estimate

58645.8

Disposal Estimate Details

Date of Estimate:

July 18, 2007

Source of Estimate:

POE

Disposal/Demilitarization Total Cost (BY 2000 \$M):

Total costs for disposal of all Ship are 1612.2

The current estimate for disposal costs for the CVN 78 Class ships is \$5,911.4M for eleven ships in BY 2000 dollars. Disposal costs include disposal of EMALS.

EMALS

Cost Estimate Details

Date of Estimate:	March 02, 2016
Source of Estimate:	POE
Quantity to Sustain:	3
Unit of Measure:	Ship
Service Life per Unit:	50.00 Years
Fiscal Years in Service:	FY 2017 - FY 2077

The current APB Objective/Threshold values and current estimate reflects Total O&S costs for three shipsets in accordance with the current Program of Record. The CVN 78 Class Program is planned for a total of 11 shipsets over a 50 year service life.

O&S Costs are developed at the ship level, on an annual cost per ship basis by cost category and appropriation, with total and annual average cost over the ship's expected service life. Costs are estimated for all categories listed in the CAPE Operating and Support Cost Estimating Guide using historical data from operating carrier classes and the OPNAV "Maintenance" Notices. Maintenance and Personnel costs are the major contributors to the total O&S Program.

Sustainment Strategy

EMALS will be under a blended support and sustainment scenario by the Original Equipment Manufacturer (OEM), General Atomics (GA), and Navy support from Naval Air Systems Command (NAVAIR) PMA 251 as is applicable. The intention is for GA to provide support and have the shipyards and the Navy to provide the both industrial level support, (i.e. cranes, lifts, power (including step down backup) and air) as well as shop modifications, equipment to support motor repairs, equipment storage areas and temperature controls.

The final EMALS System Maintenance Plan review was conducted in November 2015. The delivery of final maintenance planning information is currently projected to be 3rd quarter FY 2016 as part of the submission of Provisioning Technical Data. Depot Planning to support out year requirements is slated to begin during FY 2018 with an estimated completion date of FY 2019/2020.

Antecedent Information

EMALS is specifically designed to meet the requirements of the CVN 78 class. The advanced technologies and capabilities, and unique ship interface requirements of EMALS do not exist in any legacy launcher systems. As such, there are no comparable antecedent systems.

Annual O&S Costs BY2000 \$M		
Cost Element	EMALS Average Annual Cost Per Ship	No Antecedent (Antecedent)
Unit-Level Manpower	4.453	0.000
Unit Operations	0.000	0.000
Maintenance	5.995	0.000
Sustaining Support	1.494	0.000
Continuing System Improvements	3.658	0.000
Indirect Support	1.704	0.000
Other	0.000	0.000
Total	17.304	--

Item	Total O&S Cost \$M			
	EMALS			No Antecedent (Antecedent)
	Current Development APB Objective/Threshold	Current Estimate		
Base Year	2574.3	2831.7	2595.6	0.0
Then Year	6422.6	N/A	7832.0	N/A

Total O&S cost for 11 Shipsets would be \$9,517.0M in BY dollars/\$44,956.0M in TY dollars.

Equation to Translate Annual Cost to Total Cost

Total Cost = Average Annual Cost Per Shipset * number of Shipsets * Service Life = \$17.304M * 3 * 50 = \$2,595.6M

O&S Cost Variance		
Category	BY 2000 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2014 SAR	2574.3	
Programmatic/Planning Factors	21.3	Revised to reflect movement of depot stand-up from FY 2017 to FY 2021.
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	21.3	
Current Estimate	2595.6	

Disposal Estimate Details

Date of Estimate:July 18, 2007

Source of Estimate:POE

Disposal/Demilitarization Total Cost (BY 2000 \$M):Total costs for disposal of all Ship are 0.0

EMALS disposal costs are included in the CVN 78 Class Disposal Cost.